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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/085,116 | 03/01/2002 | Toru Mori | PF-2944/ NEC/US/mh | 7223 |

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EXAMINER

NGUYEN, CUONG QUANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/085,116

Applicant(s)

MORI ET AL.

Examiner

Cuong Q Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: .

DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Embodiment 5 as shown in Fig.6 and Fig.7, claims 1-20 in Paper No. 6 is acknowledged. However, the limitations "wherein said stacked capacitor is provided on a first surface of said printed circuit board and a second surface of said printed circuit board" in claim 12 are not shown in the elected Embodiment. So, claim 12 has been withdrawn from consideration.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 4-8 and 15-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is not enablement for the claims 4 and 15 which include both limitations "vias in said dielectric layer, so that said terminal electrode being electrically connected through said vias to said first and second internal electrodes" and "wherein said via connected through said terminal electrode to power line is electrically isolated from said first and second internal electrode" because it is impossible for internal electrode (the first internal electrode) forming in the via electrically connected to the power line while the via is electrically isolated from the first internal electrode (in the present invention,

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only via which is electrically isolated from the internal electrode is the signal via not the power via). It is also not enablement for the claims 45 and 16 which include both limitations "vias in said dielectric layer, so that said terminal electrode being electrically connected through said vias to said first and second internal electrodes" and "a low dielectric layer around said via, and said via is separated from said dielectric layer by said low dielectric layer" because in the present invention the low dielectric layer surround only signal via not the power via or ground via which mentioned in claims 1 and 10.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, and 10-11, and 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Farooq et al. (US 6,072,690).

Regarding claims 1, Farooq et al. discloses a stacked capacitor comprising: a dielectric; a two-dimensional array of terminal electrodes on at least one of first and second surface of the dielectric layer; internal electrodes (67) stacked in multi-levels in the dielectric layer; internal electrodes (68) stack in multi-levels in the dielectric layer; vias

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(64, 66) formed in dielectric layer so that terminal electrodes being electrically connected through vias to internal electrodes (67) and (68), and wherein first and second terminal electrodes being electrically connected voltage vias (64) and (66) (col.5 lines 10-16).

See Farooq et al.'s Fig.3A.

It is noted that in order to make the capacitor operating, the one of internal electrodes (67) and (68) have to electrically connected to a power line and the other have to electrically connected to a ground line. So, it is inherent that the internal electrode electrically connected to the power line is considered as a first internal electrode and the one electrically connected to the ground line is considered as a second internal electrode, assume electrodes (67) are the first internal electrode and electrodes (68) are the second internal electrodes.

Regarding claims 2, 3, as shown in Farooq et al.'s Fig.3A, two dimensional array electrodes are provided on both first and second surface of dielectric layer and comprise alternating alignments of terminal electrodes connected to power line and terminal electrodes connected to the ground line.

Regarding claims 10, 11, 13, 14, Farooq et al. teaches that the capacitor structure is a part of a semiconductor device, wherein the capacitor is formed between a semiconductor chip (a semiconductor integrated circuit) and a single or multi-chip carrier (col.3 lines 54-64) which includes a printed circuit board (col.2 lines 1-5).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. in view of Nagakari et al. (US 6,573,584).

Farooq et al. Teaches all the limitations of claims 1 and 10 above and further teaches that the dielectric comprising high-k dielectric material at between internal electrodes (use to be called as capacitor dielectric). However, Farooq et al. does not explicitly teach the capacitor dielectric is formed of a perovskite structure compound.

It is conventional and also taught by Nagakari et al. that the perovskite structure compound is an art recognized material for forming the high-k capacitor dielectric in semiconductor device.

It would have been obvious to one of ordinary skill in the art to form perovskite structure compound as the high-k capacitor dielectric layer in Farooq et al.'s device in

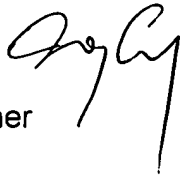
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order to have capacitor dielectric of a high relative permittivity in a high frequency range.

Conclusion

5. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 872-9306. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.
6. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (703) 308-1293. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.
7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Eddie Lee who can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.
8. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.

Cuong Nguyen
Primary examiner



11/19/03